REMARKS

This reply encompasses a bona fide attempt to address the rejections raised by the Examiner and presents amendments as well as reasons why the applicants believe that the claimed invention is novel and unobvious over the closest prior art of record, thereby placing the present application in a condition for allowance.

Regarding Claim Status

Claims 1-35 were examined. Claims 1-35 were rejected. With this response, claims 1-35 are pending.

Regarding 35 U.S.C. § 103 Rejections

Claims 1 and 2 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Xunlei Wu, Michael Downes, Tolga Goktekin, and Frank Tendick, "Adaptive Nonlineear Finite Elements for Deformable Body Sinulation Using Dynamic Progressive Meshes" Euorographics 2001, Vol. 20, No. 3, herein referred to as Wu, in view of "Preliminary Finite Element Analysis with SAGE", 2000, herein referred to as PFEAS. The Examiner states that Wu discloses a Long Elements Method (LEM) for real time physically based modeling of a deformable medium in the Abstract. Applicants respectfully submit that the Abstract refers to a finite element method (FEM), not a LEM. FEM is a generic term for a type of mathematical method in which meshing is used to discretize a continuous domain into a set of discrete subdomains. Many types of FEM methods exist, including that described by Wu. In contrast, Applicants' invention is a LEM, a novel type of FEM that is not taught by Wu. The Examiner is invited to review the attached excerpt from a survey of deformable modeling methods written by Remis Balaniuk. entitled "Real-time Simulation of Deformable

Objects", which will be published in the conference proceedings of the VIII Symposium on Virtual Reality. This excerpt provides a description and comparison of FEM and LEM.

The Examiner further states that Wu teaches a FEM that uses a meshing strategy based on b^2, where b is a length of a side of the deformable medium. The Examiner refers to page 2, left side column, lines 10-12. Applicants respectfully submit that this passage refers to standard matrices that describe linear finite elements, the mass matrix, the damping matrix and the stiffness matrix. These matrices describe the properties of the finite elements, rather than characterize the number of elements used in a given meshing strategy. The described matrices generally have a size of N^2, where N is the number of degrees of freedom of the system. (See page page 1, right column, lines 19-20 for the definition of N). Degrees of freedom express the number of options available in a space. For example, an object that can move in three directions has three degrees of freedom. In contrast, Applicants' method, as claimed in claim 1, refers to a meshing strategy based on a plurality of long elements, wherein the number of long elements is proportional to b^2, and where b is the length of a side of the deformable medium. Thus, Applicants' claim refers to the number of long elements used in a deformable model, rather than the properties of these elements. In addition, b describes a length of a side, in contrast to N, which describes a degree of freedom. It is therefore respectfully submitted that Wu neither teaches a Long Elements Method nor a number of long elements that would be useful for meshing. Similarly, PFEAS refers to an existing finite element computer program called SAGE (page 1, lines 8-9), not a long element model. Applicants respectfully submit that as the examiner suggests modifying the teaching of Wu with PFEAS, and neither Wu nor PFEAS teaches a long element model, claim 1 is not obvious from the combination of Wu and PFEAS and therefore should be

allowed. As claim 2 is dependent on claim 1, Applicants respectfully submit that claim 2 should also be allowed.

Claims 3-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wu, PFEAS, and in further view of Sara Gibson et al., "Volumetric Object Modeling for Surgical Simulation", MIT, 5 November 1997, herein referred to as Gibson. Applicants respectfully submit Gibson teaches a FEM not a LEM (see page 3, lines 30-31). As describe above, the terms FEM and LEM are not interchangeable. Therefore, Applicants respectfully submit that claims 3-20 are not obvious from the combination of Wu, PFEAS and Gibson and should be allowed.

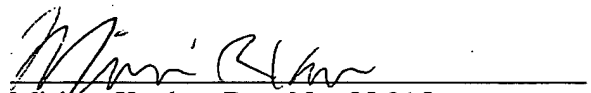
Claims 21-35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wu, PFEAS, Gibson, and US Patent No. 6,259,453 issued to Itoh, herein referred to as Itoh. Applicants respectfully submit that none of the above references teach a long element method. In fact, Itoh teaches against the use of long elements in column 1, lines 40-43, "According to an analysis performed using computational dynamics, an extremely long element...adversely affects the analysis result." Thus, Applicants respectfully submit that claims 21-35 are not obvious from the combination of Wu, PFEAS, Gibson and Itoh and should be allowed.

Conclusion

For the foregoing reasons, it is respectfully submitted that the invention as set forth in independent claim 1 recites subject matter that is patentably distinct, under 35 U.S.C. § 103(a), from Wu, PFEAS, Gibson and Itoh. Accordingly, claim 1 is submitted to be patentable and therefore should be allowed. Claims 2-35 are submitted to be patentable as they are dependent on independent claim 1.

This Reply is submitted to be complete and proper in that it places the present application in a condition for allowance without adding new matter. Favorable consideration and a Notice of Allowance of all pending claims 1-35 are therefore respectfully solicited.

Respectfully submitted,



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